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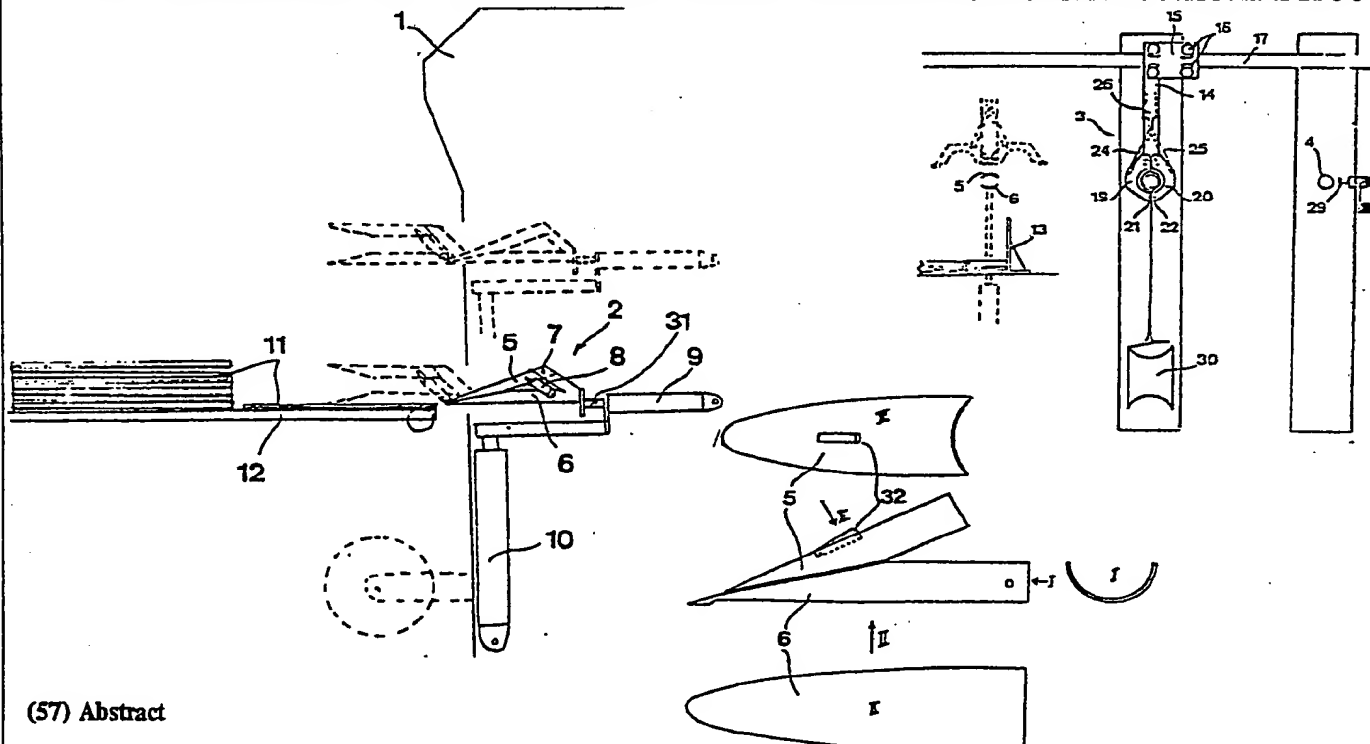
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(54) Title: PROCEDURE AND APPARATUS FOR POSITIONING VALVE BAGS ONTO FILLING MACHINE SPOUT



(57) Abstract

The positioning of a valve bag onto a filling spout comprises the retaining of the valve of a bag and a subsequent insertion of an insertion member (2) into the mouth of the stationary bag and a distention of the opening, the gripping around the distended valve by means of a gripping member (3), withdrawal of the insertion member, and a bringing together of the valve opening and the filling spout (4). The apparatus designed to carry out the invention comprises an insertion member (2), a gripping member (3) and means to move these members in accordance with the method.

## 1.

**Procedure and apparatus for positioning valve bags onto filling machine spout**

This present invention concerns a procedure and an apparatus designed for the positioning of valve bags onto a filler machine spout. The procedure is of the kind where the individual bags are grasped and taken  
5 through a process in order to open the valve of the bag, whereafter the valve opening is fitted onto the filling spout, and held in readiness to fill the bag.

**Background Art.**

There are several ways to position valve bags onto a  
10 filling machine spout according to prevalent technology.

Automatic positioning apparatus used so far first positively open the valve portion of the bag, and then place the valve opening over the spout, the latter  
15 taking place by either positioning the valve portion of the bag over the spout, or, alternatively, by bringing the filling spout into the valve opening.

One known method of positioning bags involves the opening of the valve by means of suction cups, contacting and grasping the bag along two lines parallel  
20 to the edges of the valve.

By tilting the positions of the two lines of suction cups in such a manner that the middle part of the top portion forms an upward facing back, the valve is forced to open, and in the resulting position the bag  
25 can be brought into contact with the filling spout.

## 2.

Another method to open the valve is one where the suction cups are merely used to keep the upper layer of the top portion tight in a certain position, whereupon an insertion member is brought to press  
5 against the underlying layer near the valve mouth and thereby tearing the valve open.

Likewise, suction cups have been used in a known apparatus where the bags, in a flat and stretched position, are grasped and kept stationary by suction cups at the side of the bags. Other, moving  
10 suction cups, placed on the valve itself, can then rip open the parts of the valve, giving room for the insertion of the filling spout.

Finally, compressed air can be used to open the valve. The technique involved here positions the valve portion of the bag tight against a surface, and a nozzle directed at the valve mouth forces it open by means of a high-pressure discharge of air, facilitating the insertion of the filling spout.

These known methods employed in automatic filling appliances all have a number of drawbacks, which this present invention tries to avoid. The use of suction cups to keep the bags in position and to open the valve portions of the bags necessitates  
20 the utmost uniformity of bags and exact positioning if the suction cups are to get a firm grip.

It has proved difficult to ensure with certainty a perfect opening of bag valves when using suction cups as folds and similar irregularities, which  
30 may arise when glueing the top portion of the bag, tend to reduce the gripping ability of the suction cups, and, in some cases, a firm hold will be quite impossible.

3.

During the production of bags it sometimes happens that excess application of glue will cause the actual valve opening to jam. Such bags could very well be used if only the valve is forced open before reaching the filling spout. The known techniques involving the use of suction cups and compressed air from a nozzle frequently fail to open such bags with glued valves, and the bag will have to be taken out, the otherwise continuous and automatic filling will be disturbed, in certain filling lines causing loss of material, as the absence of a bag with open valve will have the effect that material simply pours out without control.

It is the purpose of this invention to avoid the drawbacks mentioned above, and to delineate a method and an apparatus which will ensure positive, complete, and maximum opening of the valve, and also a certain and perfect contact with the filling spout.

#### Disclosure of Invention.

This is achieved by means of a method according to claim 1, comprising the following steps,

- a) securing, at least, the top portion of the bag provided with valve,
- b) inserting an insertion member into the valve opening to ensure a maximum utilization of the diameter,
- c) gripping, by means of a gripping member, the valve of the bag, preferably near the mouth of the still fully open valve,
- d) withdrawal of the insertion member,
- e) bringing together, by means of the gripping member, the bag and the filling spout, the latter being inserted into the open valve opening.

4.

It seems quite obvious that the utilization of this method will ensure that even bags with glue in the valve opening will be forced open at the insertion of the insertion member through the mouth of the valve. The subsequent gripping by a gripping member round the valve will keep the bag valve at maximum opening and diameter, as the parts of the valve are forced to follow the movements of the gripping member surfaces facing the valve.

10 Having withdrawn the insertion member from the valve, the valve can be brought into contact with the filling spout, either by letting the gripping member take the bag to a stationary filling spout, or by inserting a filling spout into the valve opening while the valve  
15 is kept stationary.

The apparatus, designed to perform the method in accordance with claim 1 and of the kind where there is a retaining member to retain the top valve portion of the bags at least, and a distention member to stretch  
20 the valve opening, is unique in that it comprises a mobile insertion member with at least one forward wedge-shaped part designed to enter, through a progressive movement of the insertion member flush with the retained portion of the bag, into the mouth of the  
25 valve, and also in that said insertion member is designed in such a way that, when fully inserted, it has a cross-section, at least near the edges of the valve, which essentially distends the valve opening, and also a gripping member provided with mobile claws designed  
30 to grip or clasp the distended valve near the edges of the valve mouth, which claws when gripping are provided with surfaces of a form which, by and large, is similar to the cross-section of the insertion member at the point in question.

## 5.

In spite of its simple construction, this apparatus ensure a complete opening of the valves of the bags. The description shows that the valve opening is forced open through insertion of the insertion member, and even if some residual glue should cause the valve to

5 stick together full distention of the opening will be achieved as a result of the fact that, when fully inserted, the insertion member has a cross-section equal to the size of the mouth of a valve when fully open.

10 An improved version of the insertion member is achieved if designed, as in claim 3, in the fashion where the insertion member is composed of a number of movable parts which, in one position, together form the progressive wedge-shaped portion, and which, in a different

15 position, form a cross-section constant throughout its length essentially and preferably circular and of a size equal to the exact size of the fully distended valve opening.

Using the above insertion member, the distention of the

20 valve mouth is effected by first letting the forward wedge-shaped portion of the insertion member progress in through the mouth of the valve. This causes the mouth to stretch and further makes possible the second position of the insertion member where the individual parts

25 of the insertion member change their mutual position in such a way that an overall, extended shape of the insertion member is achieved, i.e. the cross-section of the insertion member is increased, the increase causing the valve opening to positively stretch.

30 An especially recommendable embodiment of the insertion member is described in claim 4, where the insertion member consists of two elongated parts, both provided with a forwardly pointed portion and a rear portion provided

## 6.

with, at least one part, a hinged connection so that it may be positioned in such a way that the two forward portions form together the progressing portions, or alternatively be positioned in a way where the two insertion parts are essentially parallel, in which second position they form a shape in a size similar to that of a fully distended valve bag opening, and furthermore that the insertion members are mobile lengthwise, or at least one insertion part.

Thus, a simple and effective insertion member is achieved which, when in one position, is able to penetrate the mouth of the valve, and, when in the second position, is able to increase its shape so as to cause the full and complete opening.

In the event where the insertion parts are designed, as described in claim 5, in such fashion that the insertion parts take the shape of halved cylindrical shells, pointed forward, and positioned with interfacing concave surfaces, the distention of the valve opening will reach the maximum.

Ideally, the gripping claws and the insertion member are designed in such a manner that the cross-sections of the insertion member when distended, and the gripping claw surfaces against the valve when in the gripping position, are identical to the cross-section of the filling spout. This will ensure the shaping of the valve opening corresponding to the shape of the filling spout, and further ensure a correct feeding of bags onto the spout.

The circular cross-section is especially preferable because it results in maximum opening as well as the optimum stability of the distended valve.

When bags are stacked it may be difficult for the

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insertion member to penetrate properly the valve opening, as the bags are not stretched flat, but arch near the middle. By making the insertion member as a whole pivotable at the rear end round a horizontal shaft lying across the direction of the progression, the insertion member will be able to follow the shape of the bag and thereby positively ensure penetration into the bag valve.

In case the bag valve is completely glued, or if for some other reason penetration of the insertion member is not possible, it would be expedient to have the bag removed before the apparatus carries out an entire operation. This is done by providing the insertion member with a sensor to indicate whether the member has penetrated the valve, or has slipped past. The sensor can be a switch, photoelectric cell, or other known sensor, connected to a device designed to remove the bag. The latter could be an arm provided with suction cups or similar means. Likewise, the sensor is connected to the plant as a whole, and if there is no pulse from the sensor operations will not continue, but the insertion member will go in position to take another bag. Ideally, the sensor can be a toggle switch built into the upward-facing surface of the insertion member, and in case the insertion member penetrates the valve opening, the switch is activated, or vice-versa.

In order to further enhance the penetration of the insertion member into the bag valve there may be a finger, as indicated in claim 12, which finger exerts pressure onto the portion of the bag in front of the valve, which will cause the valve to open slightly, and at the same time keep the bag sta-



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tionary. For the upper bags of the stack, the underlying bags will supply the flexibility necessary to open the valve, but the last bags of the stack will need more flexibility than the hard table that form the basis. As indicated in claim 13 it is therefore possible to include a swage or a raised platform with a swage, with or by an elastic material, in such a way as to permit a suppression of the valve mouth.

#### 10 Brief Description of Drawings

One embodiment of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

- Fig. 1 is a side view showing part of a bag fitting apparatus carrying out the method according to the invention, the part including the actual insertion member;
- Fig. 2 is an enlarged projection of the individual parts of the insertion member;
- 20 Fig. 3 shows the gripping member in the process of gripping an already distended bag valve;
- Fig. 4 shows the bag fitting machine seen from the front, and
- Fig. 5 is a fragmentary view of the transporter/
- 25 table immediately below the insertion member.

#### Description of the Preferred Embodiment

A bag fitting apparatus designed for fitting bags onto the spouts 4 of a filling plant 1 comprising, mounted on a chassis not shown, an insertion member 2 (figs. 1 and 2) and a gripping member 3 (fig. 4).

The insertion member 2, as demonstrated in figs. 1 and

- 2, consisting of two parts 5,6, pointed at the forwardly progressing end, and where one part 5 pivotably connects to a bearing 7 at the rear end. The two parts, each taking the shape of halved cylindrical shells with a pointed end and the two concave insides facing each other, are shown in the initial position (full lines), where the pointed, forward ends of the two parts 5,6 meet to form an aggregate wedge-shaped insertion portion 2.
- 10 The mobile insertion portion can be moved by means of a hydraulic or pneumatic cylinder 8, mounted between the two insertion parts 5,6 into the second position, shown in dot-and-dash lines in fig. 1, where the insertion portion are essentially parallel.
- 15 The insertion portion 2 connects to the piston rod of a horizontally mounted hydraulic or pneumatic cylinder 9, by means of which the insertion portion 2 can be made to move horizontally.
- 20 The entire arrangement mentioned consisting of insertion portion 2 and the horizontally mounted cylinder 9 will move vertically and can be made to move by means of the piston rod of a vertically mounted hydraulic or pneumatic cylinder 10.
- 25 Thus, the insertion portion 2 is mobile both vertically and horizontally and can be made to take the positions indicated on the drawing, where, likewise, the mutual positions of the two insertion parts 5,6 are delineated.
- 30 The penetration and distention of a bag is effected in the following manner: Bundles of bags 11 are fed to the bag fitting machine by a transporter 12. The bags are guided, inter alia by means of a fence 13 (fig. 4) in order that the longitudinal direction of the valve

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corresponds to the longitudinal direction of the insertion portion, and that the mouth of the valve complies with the position of the insertion portion.

5 A retaining member not shown next grasps the edge of the valve facing the apparatus, and the wedge-shaped insertion member 2 is progressing forward and into the mouth of the valve, forcing it open in the process. Thereafter the hydraulic or pneumatic cylinder 8 is activated, so that the movable insertion part 6  
10 moves out horizontally, thereby distending the valve. A subsequent activation of the cylinder 10 lifts the distended valve bag to a certain height over the transporter. In that position, the valve is gripped by the gripping member 3 in the mode hereinafter described:

15 The gripping member (cf figs. 3 and 4) consists of an arm 14, connected to a carriage 15. By means of rollers 16 and a tensile force not shown, the carriage can be made to move horizontally along a girder 17, the ends of which are mounted in bearings not shown. Thus, the  
20 girder can be turned round its longitudinal axis through a hydraulic or pneumatic cylinder 18, whose one end connects to the chassis 0, and whose other end, via an arm, is connected to the girder 17.

25 At the end of the arm of the gripping member 13 a pair of gripping claws 19, 20 are pivotably mounted, having inside surfaces which, in the gripping position, are of the same shape as the filling spout 4 and as the cross-sectional shape of the insertion member when extended, which latter shape is approximately circular.

30 The gripping claws are made in a material such as sheet or plate, and each claw comprises, as shown in fig. 3, two identical parts, kept together by means of a cross-piece 21 and a connecting shaft 23. The connecting shaft is pivotably mounted in the arm 14, so that the claw can rotate.

## 11.

To each of the claws a traction bar 24,25 is fitted, the free ends of which hinge together to the piston rod of a hydraulic or pneumatic cylinder 26.

The cylinder 26 is mounted inside the arm 14 of the gripping member 3 in its longitudinal direction and will, when activated, move the traction bars 24,25 so as to turn the claws 19,20 in order that the claws may take a closed, gripping, or open position.

The gripping member is able to make a tilting movement when activated by the hydraulic or pneumatic cylinder 18, a transverse movement along the girder 17 by means of a tension device not shown, and a gripping movement with its claws 19,20 by means of the cylinder 26.

When, as already described, a bag arrives by the transporter 12 and has been distended and lifted by the insertion member, the distended valve of the bag 27 is clasped by the two claws 19,20 of the gripping member, whereafter the insertion member withdraws to return to its initial position as shown in fig. 1. Next the gripping member is turned by means of the cylinder 18, rotating the girder 17 to a tilted position, as indicated with dot-and-dash lines in fig. 3. In this tilted position, the carriage 15 of the gripping member is made to move along the girder by the tension force not shown, until the gripping member is in position with the filling spouts 4.

The filling spouts are placed under the girder 17 in such a distance that, when the gripping member now rotates back, the gripping member fits exactly over the filling spout, fitting onto the spout the distended valve of the bag 27.

12.

A retaining device, consisting of cylinder 28 with a rubber stopper mounted to the piston rod, is now activated so as to keep tight the bag 27 against the spout 4.

- 5 By going through the movements beforementioned, the gripping member next returns to its original position in order to grip a new bag and take it to a new filling spout.

The bags having been fitted, the material in question  
10 pours out to fill the bag, which is supported by the underlying roll 30.

When the bag is full, the retaining device 28, 29 lets go, and, caused by the position of the supporting roll 30, the bag will drop outward and onto a conveyor  
15 belt below (not shown).

The above description is concerned with a preferred embodiment of an apparatus designed to carry out the method according to this present invention.

Without leaving the original scope of the invention  
20 there will be several alternative embodiments of the apparatus.

One such alternative could be that the girder is mounted in a fixed position, and that, in return, the arm of the gripping device is pivotably mounted  
25 on a carriage or in similar fashion. Other designs and shapes of the claws and their operating and moving parts are possible, and, still within the scope of the invention, an insertion member with several moving parts is conceivable.

## WHAT WE CLAIM IS:-

1. A method for the positioning of valve bags onto a filling spout, which method is of the art where the individual bags are gripped and go through a process designed to open the valve of the bag, after which process the valve opening is brought to mesh with the spout to fill the bag, characterized in that the method or procedure of opening and positioning the valve of the bag and of bringing it to mesh with the filling spout comprises the following steps

- a) retaining at least the top portion of the bag provided with a valve,
- b) insertion of an insertion member into the valve opening in order to distend the latter,
- c) gripping or claspings by means of a gripping member round the circumference of the valve, preferably near the mouth of the still distended valve opening,
- d) withdrawal of the insertion member,
- e) bringing together, by means of the gripping member, the bag and the filling spout, which filling spout is inserted into the open valve mouth.

2. An apparatus designed to carry out the method in accordance with the invention and of the art which comprises an insertion member for the distention of the bag valve, gripping members for the gripping and keeping distended the valve, also after the removal of the insertion member from the valve, which gripping members are mounted to a carriage travelling back and forth on a rail or girder between a point where the insertion

member distends the bag valve and a point where the bag is fed onto the filling spout, characterized in that the insertion member (b) has members (a) designed to carry out a reciprocal movement, where, in its progressing position the insertion member enters the valve of the bag in order to open the valve, and also members (10) designed to lift or lower the insertion member (5), where it lifts the insertion member with the bag still hanging suspended by the insertion member, and that the gripping members (3) are pivotably mounted on the carriage (15), where the gripping member, in its lowered position grips or clasps the valve bag, after which process the gripping member, still and at the same time holding on to the bag, is lifted to a raised position, and also that the rail or girder (17) along which the carriage (15) with the gripping member (3) travels is placed in front of a number of filling spouts (4) with stops in front of the individual filling spouts, where the layout of rail or rails (15)(17) is such in relation to the spouts that the gripping member (3) in its lowered position will position the bag with its valve over the filling spouts (4), next to return to the raised or lifted position, after which the carriage (15) travels back to the initial position for another bag.

3. Apparatus according to claim 1, characterized in that the distention member comprises

a) a movable insertion member (2) with at least one forward progressing portion designed to enter, through a progressive movement of the insertion member (2) level with the top portion of a retained bag (11), into the mouth of the valve, and which insertion member (2) is further designed in such manner that when

fully inserted it has a cross-section, near the mouth of the valve at least, which essentially distends the valve opening to the maximum.

- 5 b) a gripping member (3) with mobile claws (19,20) designed to grip round the distended valve near the mouth, which claws have a surface towards the valve, when in the gripping position, of a shape which essentially corresponds to the cross-section of the insertion member (2) at the relative position.
- 10

4. Apparatus according to claim 3, characterized in that the insertion member (2) is composed of a number of interacting parts which, in one position, form an overall shape to make up a wedge-shaped front portion, and which, in another position, has a shape with an essentially constant cross-section throughout its length, which cross-section is preferably circular and of a size corresponding exactly to the size of the fully distended valve opening.

15

20 5. Apparatus according to claims 3 and 4, characterized in that the insertion member (2) consists of two lengthy parts (5,6) which are both provided with a pointed front portion and, at least one of the parts, a rear portion that is pivotably hinged (7) so that it may take up a position where the two front portions form a joint forwardly progressing and pointed portion, and also another position where they form a shape of a size identical to the size of a fully distended valve of a bag, and which insertion parts (5,6) are movable in the longitudinal direction of at least one part.

25

30

6. Apparatus according to claim 5, characterized in that the insertion parts (2) are of a shape like halved cylinder shells, pointed at the forward progressing end, and which have interfacing concave surfaces.

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16.

7. Apparatus according to claims 3, 4, or 5, c h a -  
r a c t e r i z e d i n that the underside of the  
insertion member (2) facing down towards the bag valve  
when seen during the penetration of the bag valve is  
5 parallel or approximately parallel to the bag valve,  
that the upward facing surface of the insertion mem-  
ber (2) when closed form an angle with the underside  
between 5 and 35 degrees, that the front end of the  
insertion member (2) is rounded when seen on a top  
10 view.

8. Apparatus according to one or several of the claims  
3 to 7, c h a r a c t e r i z e d i n that the in-  
sertion member (2) as a whole is pivotably mounted  
at the rear round a horizontal shaft (30) lying across  
15 the longitudinal direction in order that it may freely  
rotate from one stop below horizontal, or slightly be-  
low horizontal; and upwards.

9. Apparatus according to one or several of the claims  
3 to 8, c h a r a c t e r i z e d i n that the inser-  
20 tion member (2) has a sensor to indicate whether the  
member has positively entered the bag valve or has  
slipped past, and also that the sensor is connected  
to a device designed to remove the bag should the in-  
sertion member have slipped past the bag valve.

25 10. Apparatus according to claim 8, c h a r a c t e r -  
i z e d i n that the sensor is designed as a toggle  
switch (32) fitted into upper surface of the insert-  
ion member (2) and in such a way that the front portion  
is flush with the surface of the insertion member (2)  
30 in order that the member can unhindered slide into the  
bag valve.

11. Apparatus according to the claims 3,4, and 5,  
c h a r a c t e r i z e d i n that the cross-section  
of the insertion member (2) when extended, and of the  
35 gripping claws (19,20) when seeing the inside surface

gripping the valve, is of the same shape as the cross-section of the filling spout (4).

5 12. Apparatus according to claim 7, characterized in that the cross-section mentioned is approximately circular.

10 13. Apparatus according to claim 2, characterized in that it comprises a table onto which the bags are stacked with the valves facing up, and also comprising an arm (34), for example in the form of an air cylinder (35) mounted at the table below the insertion member (5), and which arm at the end is provided with a finger (35) designed to enter over and press down in front of the mouth of the valve of the bag.

15 14. Apparatus according to claim 14, characterized in that the table is provided with a swage or hollow, or a raised platform possibly of or including elastic material (36) at the point where the finger (35) exerts pressure against the valve opening.

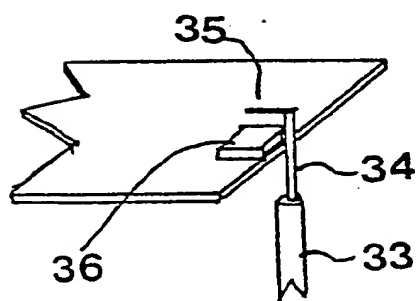
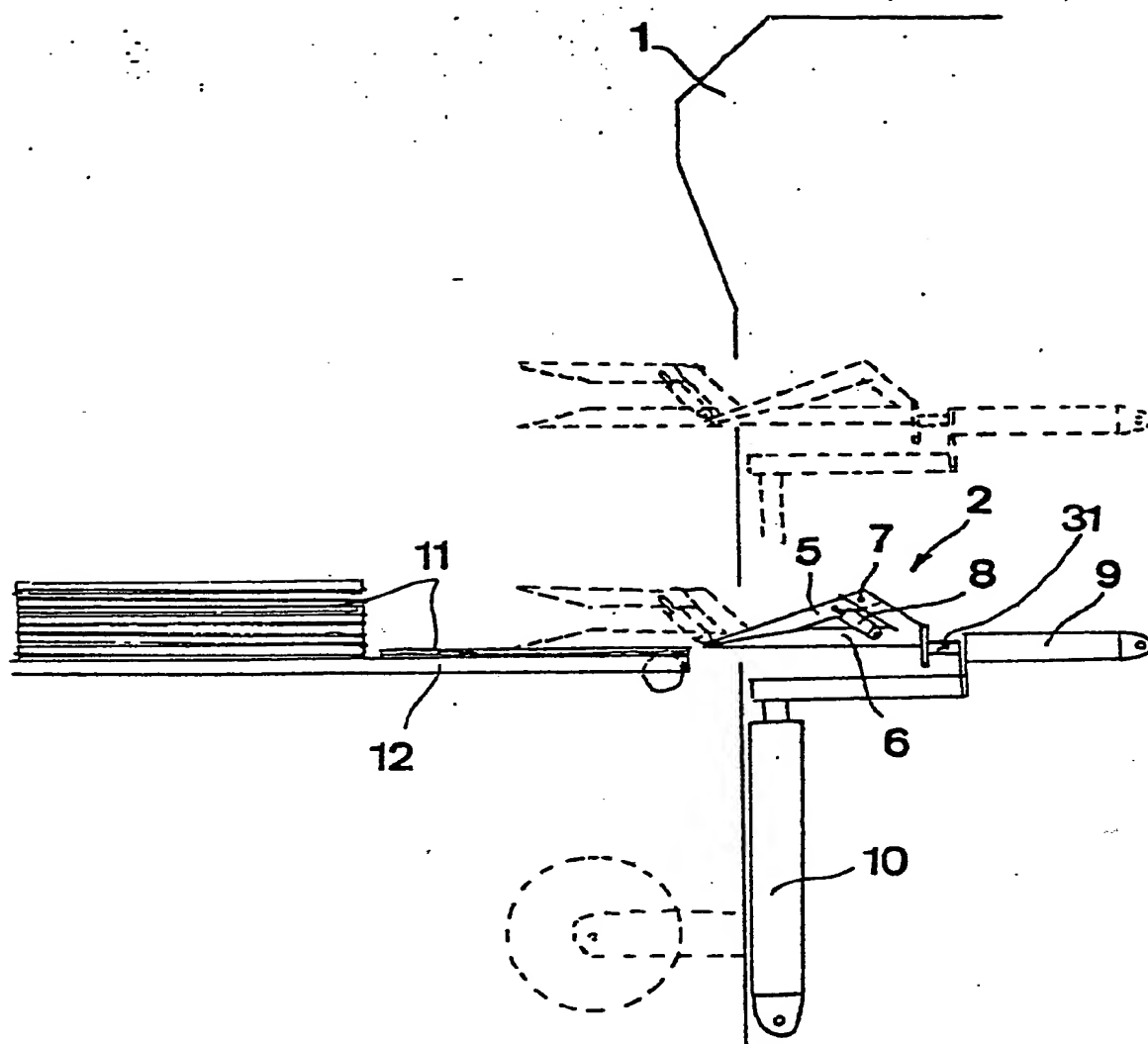


FIG 1

FIG 5

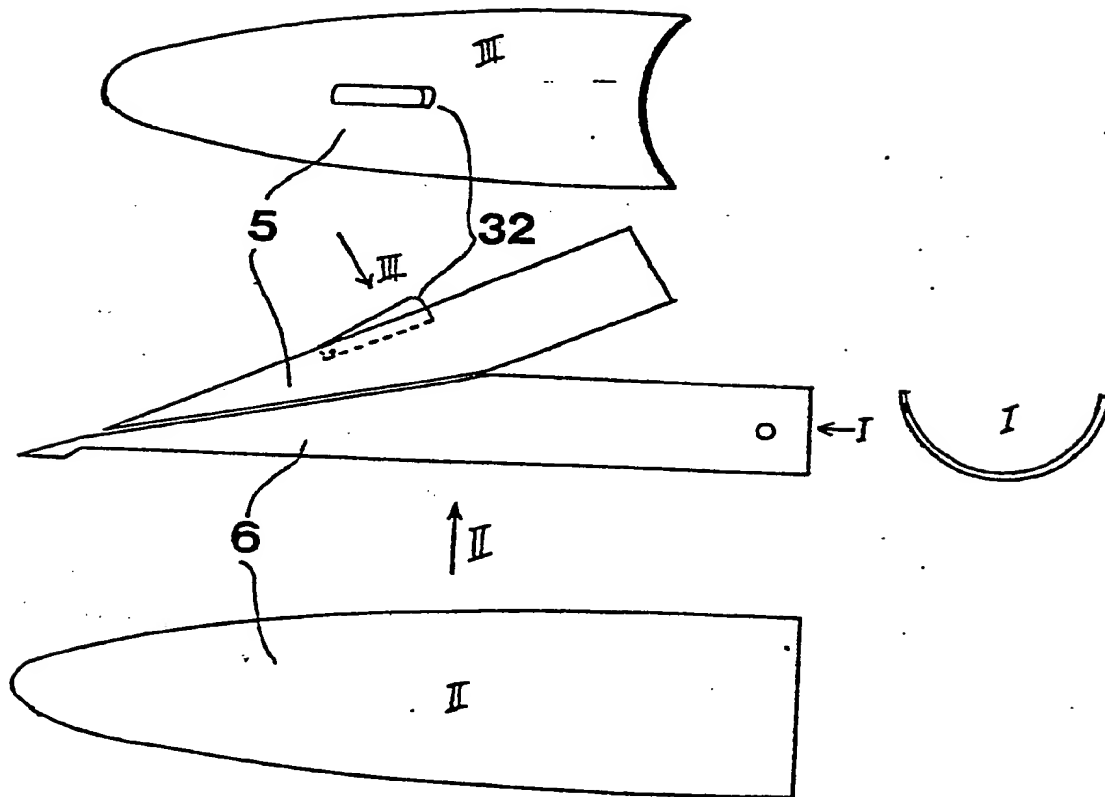


FIG 2

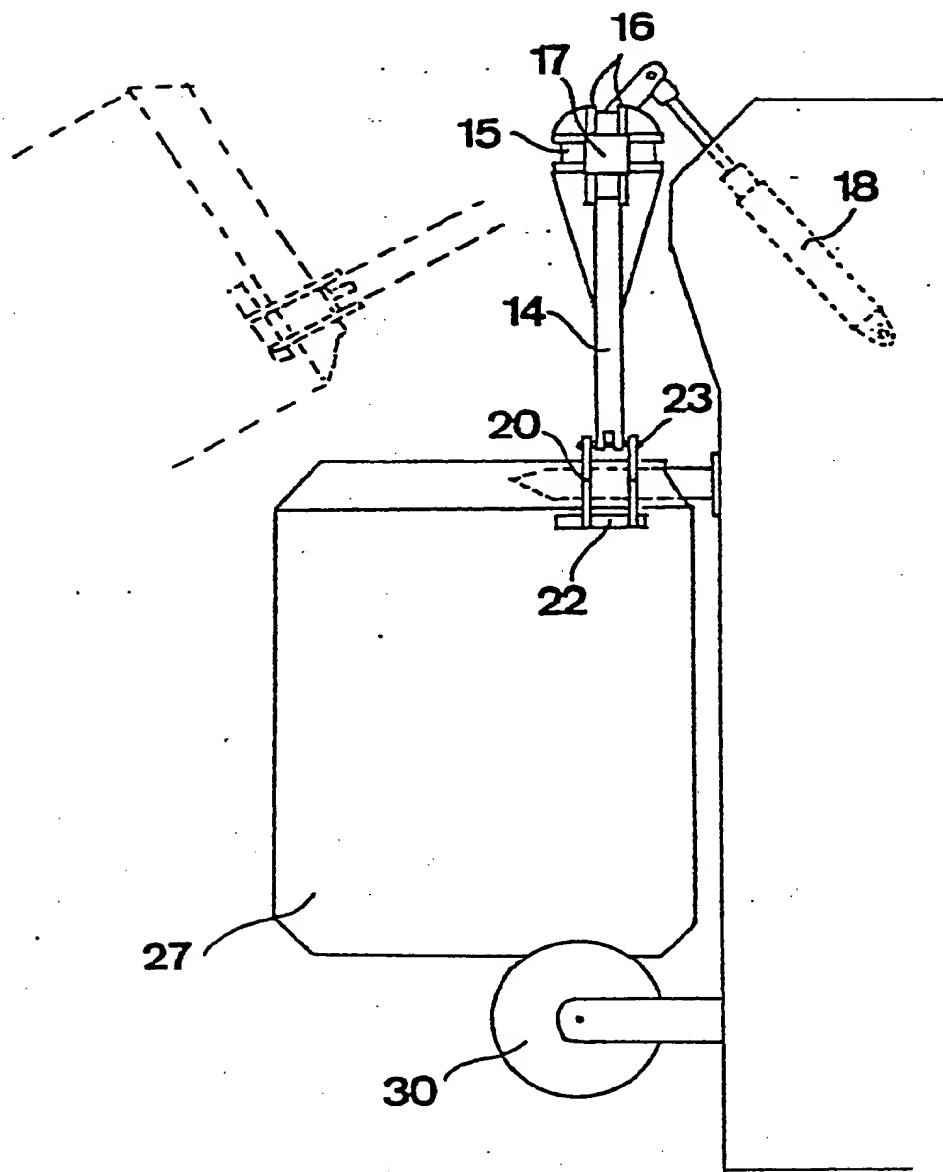


FIG 3

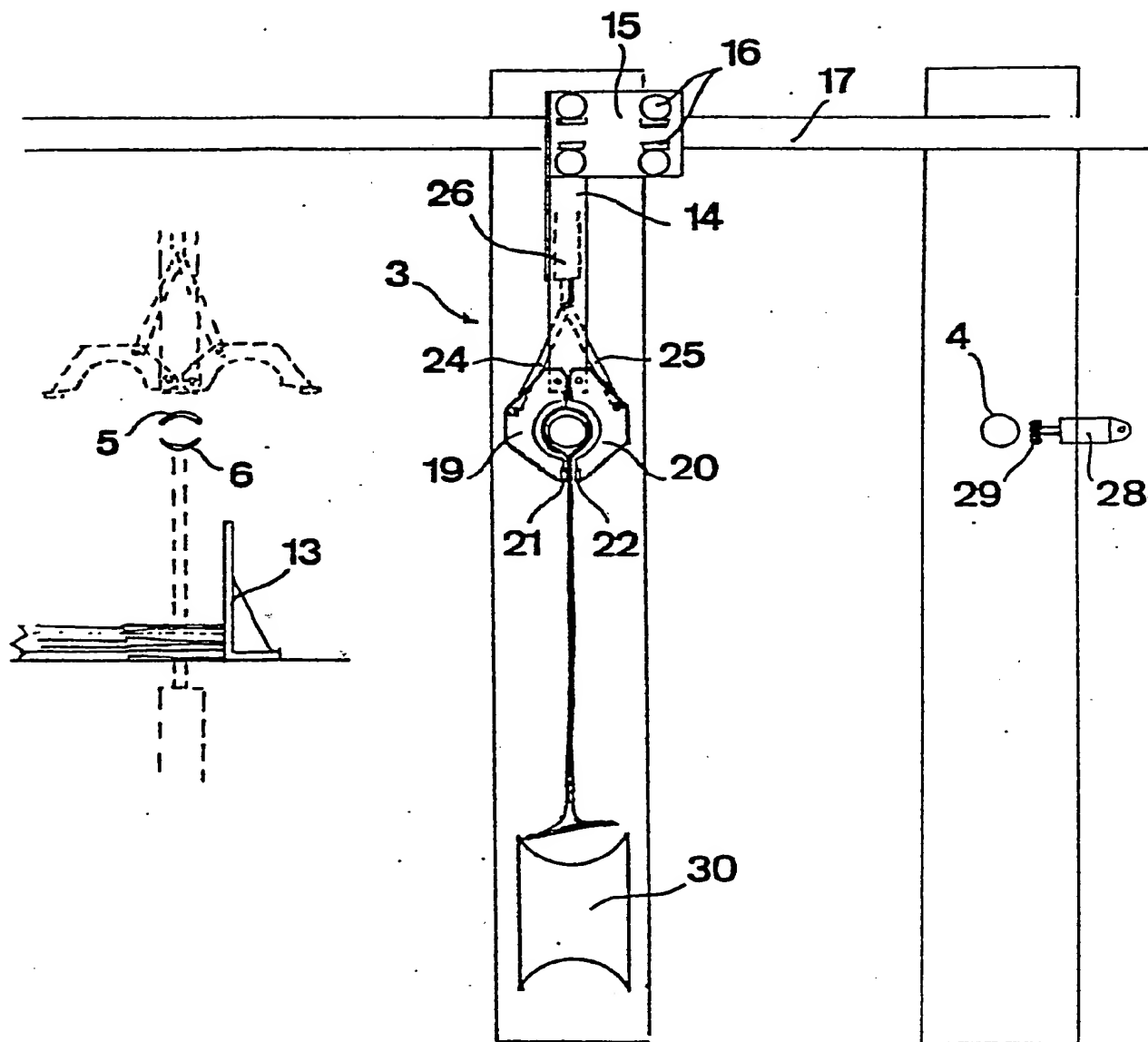


FIG 4

# INTERNATIONAL SEARCH REPORT

International Application No PCT/DX80/00077

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC 3		
B 65 B 1/18		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
IPC 3	B 65 B 1/18, 3/17	
National Cl	81a:3/10	
US Cl	141:10,67,68,76,101,114,135,137,153,165,166,269,313-317	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
SE, NO, DK, FI classes as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 14		
Category *	Citation of Document, 16 with indication, where appropriate, of the relevant passages 17	Relevant to Claim No. 18
X	DE, B, 1 212 851 published 1966, March 17, S:t Regis Bates, S A Bruxelles	1-3
A	US, A, 3 989 073 published 1976, November 2, Bernhard Beumer Maschinenfabrik KG	1-3
A	US, A, 3 900 055 published 1975, August 19, Stauffer Chemical Company	9
A	DE, A, 1 511 510 published 1969, August 28, Erwin Behn Verpackungsbedarf GmbH	1, 2
<p>* Special categories of cited documents: 16</p> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search *	Date of Mailing of this International Search Report *	
1981-02-19	1981-02-20	
International Searching Authority *	Signature of Authorized Officer 19	
Swedish Patent Office	Göran Toll	